EXHIBIT A

(Kleinfelder Report)

March 11, 2022
Project No. 20224083.001A

PG&E Law-Claims Department
8 E. River Park Place West
Fresno, California 93720

Attention: Kristin Jensen
KLJJ@pge.com

SUBJECT: Geotechnical and Materials Engineering Evaluation
PG&E Claim File No. B19446484
2845 Magnolia Street
Oakland, California

Dear Ms. Jensen:

As requested, Kleinfelder has completed a geotechnical and materials engineering evaluation of observed driveway and garage slab cracks at the above-referenced address. The conclusions and professional opinions presented in this letter are based on our review of background information provided by PG&E and a site visit conducted on January 24, 2022.

BACKGROUND

We understand PG&E conducted a gas distribution mainline replacement project in the vicinity of the referenced street address in 2016. Detailed construction records with descriptions of the excavation methods and equipment used have not been provided for Kleinfelder review, but some of the background information provided suggests trenchless methods may have been employed.

PG&E provided for Kleinfelder review copies of photographs and statements from the property owner at 2845 Magnolia Street that suggest heavy trucks and equipment (including a dump truck and compaction roller) operated in the street in front of the driveway. The property owners also indicated that construction vehicles and equipment were observed using the driveway to facilitate turn-arounds in the street. According to information provided by PG&E, the property owner claims the cracks in the driveway and in the garage floor slab appeared during or following the 2016 construction.

The following sections include an executive summary of our observations and conclusions, followed by more detailed sections that describe the findings from our site visit and the detailed descriptions of our conclusions.

Appendix A includes resumes of the Kleinfelder authors of this letter, and Appendix B includes a report prepared by the claimant's consultant titled "Investigation Report – PG&E Concrete Driveway and Garage – Weight Load Failure, March 11, 2016 – April 17, 2017," prepared by Matthew T. Kisak, P.E. of R Sinclair Group, LLC (RSG), dated 08/10/2019. Kleinfelder's response to the RSG report is provided in Appendix C.

EXECUTIVE SUMMARY OF CONCLUSIONS

Key findings and conclusions from our January 24, 2022 site visit include the following, as described in detail in the following sections.

- Both the driveway and the garage floor slab are constructed as concrete slabs-on-grade. Through nondestructive testing methods we found the driveway to be reinforced with welded wire steel reinforcement, but the reinforcement is not continuously centered within the nominal 4-inch-thick slab section. In the garage floor slab, we did not detect the presence of steel reinforcement.
- Cracks that we observed in the driveway appear characteristic of drying shrinkage cracks that are typical of concrete slab-on-grade construction.
- Cracks in the garage floor slab appear characteristic of cracks in unreinforced concrete due to shrinking and swelling foundation soils.
- In Kleinfelder's opinion, the cracks in the driveway existed prior to the work conducted by PG&E in 2016. However, the observed driveway cracks could have been exacerbated by:
    - lack of uniform soil support beneath the driveway section (as suggested by results of manual percussive sounding, described below);
    - insufficient care in the placement of steel reinforcement in the driveway (see discussion of GPR surveys below);
    - substandard concrete material quality (we have no records of materials used in construction, so this is speculative for this case);
    - substandard placement and finishing quality based upon investigative nondestructive testing methods and visual observations; and
    - excessive wheel loads (we have no clear evidence of excessive wheel loading that occurred during the time of PG&E's work, so this is also speculative).
- In Kleinfelder's opinion, the observed cracks in the garage floor are not related in any way to the activities conducted by PG&E in 2016.
    - We found no evidence of steel reinforcement in the garage floor slab (see discussion of GPR soundings below).
    - The native clayey subgrade soils in the area are commonly moderately to highly plastic and subject to volume change with changes in moisture content (i.e., soil shrinking and swelling). Although no garage floor slab construction records are available and no subsurface exploration was conducted, it is likely the garage floor was constructed over such expansive soils and that soil expansion is the principal cause of the garage slab cracks.
    - The observed vertical offset and displacement between the garage door framing and the driveway and garage slab suggest distress as is commonly associated with soils that are prone to shrinkage and swelling.
- In Kleinfelder's opinion, the August 10, 2019 Investigation Report prepared by the Claimant's consultant, R. Sinclair Group, LLC, presents findings and conclusions related to the driveway and garage slab cracks that are not supported by evidence and prevailing geotechnical or materials engineering practice.

SITE VISIT

On January 24, 2022, Kleinfelder representatives Mark Fuhriman, PE, GE, senior principal geotechnical engineer, and John Nicolini, principal materials engineering expert, visited the site to conduct limited nondestructive testing to visually evaluate as-built construction details of the driveway and garage slab. Messrs. Fuhriman and Nicolini were accompanied by a PG&E Law-Claims representative and two individuals representing the property owners.

According to information provided by the property owner representatives during the site visit, the garage, the garage floor slab and the driveway were built in the early 1980s. The garage floor slab and driveway are of Portland cement concrete construction. An overall plan sketch of the driveway and garage floor slab, annotated with observations made during the site visit, is provided on Figure 1 attached to this letter.

Photographs taken of the driveway area during the site visit are provided below.

Photo 1. 90-degree Panoramic view of 2845 Magnolia Concrete Driveway area.

Photo 2. Temporary 3’×5’ asphalt concrete patch in southwest corner of driveway by sidewalk.

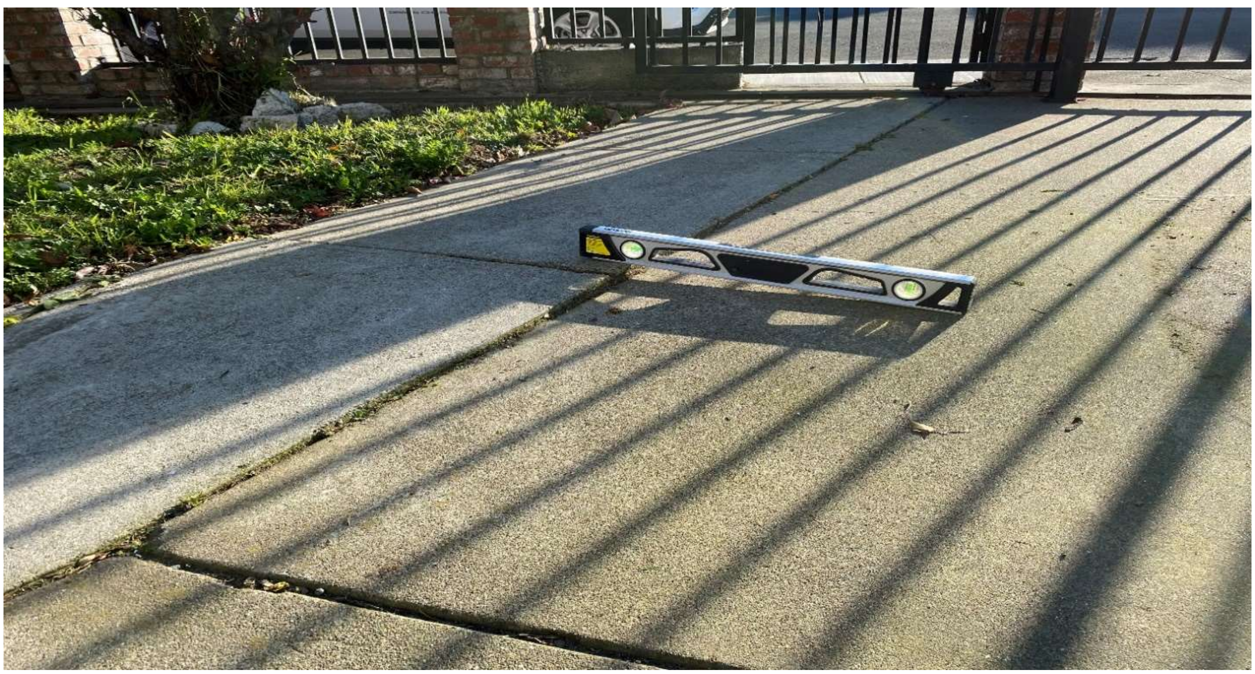


Photo 3. View along transitional walkway and circa 1980s driveway slab (with vertical offset).

Photo 4. Driveway slab typical shrinkage network cracking.

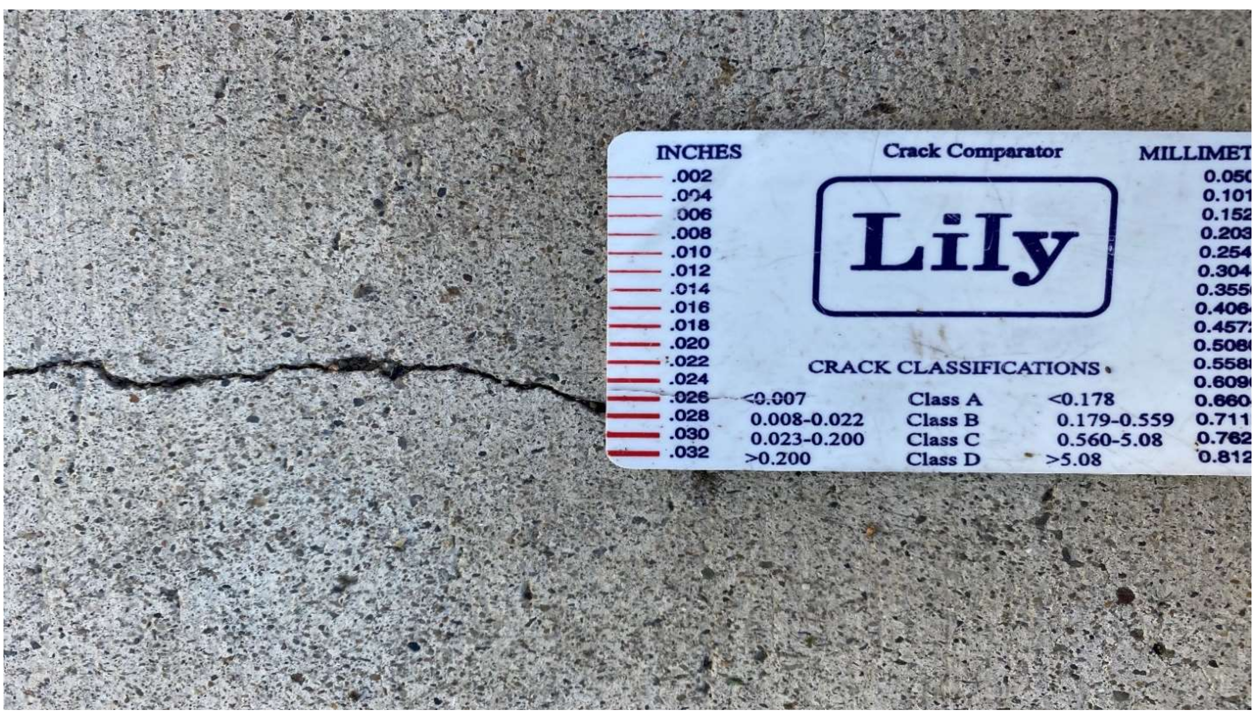


Photo 5. Typical driveway crack width.

Photo 6. Transition from driveway slab (foreground) to garage floor slab. Close-up area shown in Photo 7 below is indicated in red.

Photo 7. Transition from driveway slab (foreground) to garage floor slab. Note vertical offset and typical difference in crack size between driveway and garage slabs.

Photo 8. Garage floor crack with typical vertical offset. This slab exhibits a lack of control joinery normally required to assist in directing early stage crack development.

Photo 9. Garage floor network cracking with substantial vertical offset (typical).

Photo 10. Garage floor crack development and width.

Photo 11. Typical floor crack networking, from near back of garage.

Photo 12. Vertical offsets between garage frame and floor and driveway. See close-up view in Photo 13 below.

Photo 13. Vertical offset between garage frame and driveway slab, indicating possible volume change in driveway concrete during curing and/or volume change of soils under garage floor and garage frame foundation.

Descriptions of the nondestructive testing, our visual observations, and our conclusions are provided below.

Ground Penetrating Radar

Non-destructive surveys were performed on the driveway and garage floor slab using a StructureScan® high resolution Ground Penetrating Radar (GPR) unit manufactured by Geophysical Survey Systems, Inc. (GSSI). The instrument provides for detection of voids within and under the structure, metallic and non-metallic targets in concrete structures and is capable of detecting these objects to a maximum depth of 24” under field use applications. Statements of accuracy are generally variable due to differences in radiogram imagery produced and can be impacted based upon concrete quality and condition of moisture content in place. Scan lengths were reduced to short runs to enhance radiogram quality, accuracy and clarity wherever possible.

Non-destructive field evaluation techniques and equipment were used in general accordance with ACI 228.2R-13 “Nondestructive Test Methods for Evaluation of Concrete in Structures; and ACI 201.1R-08 Guide for Conducting a Visual Inspection of Concrete in Service.”

Based on the GPR surveys performed and our visual observations and measurements, the following as-built construction details of the driveway have been determined.

- Construction Type: Conventional Concrete Slab on Grade
- Area of Concrete Construction: Approximately 950 square feet
- Reinforcement: Welded Wire Fabric (WWF) 6”×6” (*wire fabric thickness not determined by survey)*
- Slab Thickness: 4½” - 5½” (*localized indications of shallower thickness*)
- Reinforcement Position Measured from Top of Slab: 3¾” – 4¾” (*typically appears below mid-depth of slab section*)

Review of the GPR radiograms suggests variable concrete slab thickness in the driveway slab area. Based upon interpretation of the GPR radiograms, the slab area appears as a nominal 5-inch thick slab with indications of localized thinner sections. The interpreted reinforcing (WWF) appears to be positioned variably in depth throughout the slab thickness and does not appear to be centrally located within the slab thickness and in some instances appears to be positioned in near contact with subgrade soil. Conventional reinforcing detailing requires construction reinforcement of this type to be positioned centrally within the concrete slab section.

Typical radiogram images of the driveway and garage floor slab areas are provided below in Photos 14 and 15. Approximate locations from where these images were taken are shown on the schematic driveway plan, Figure 1.

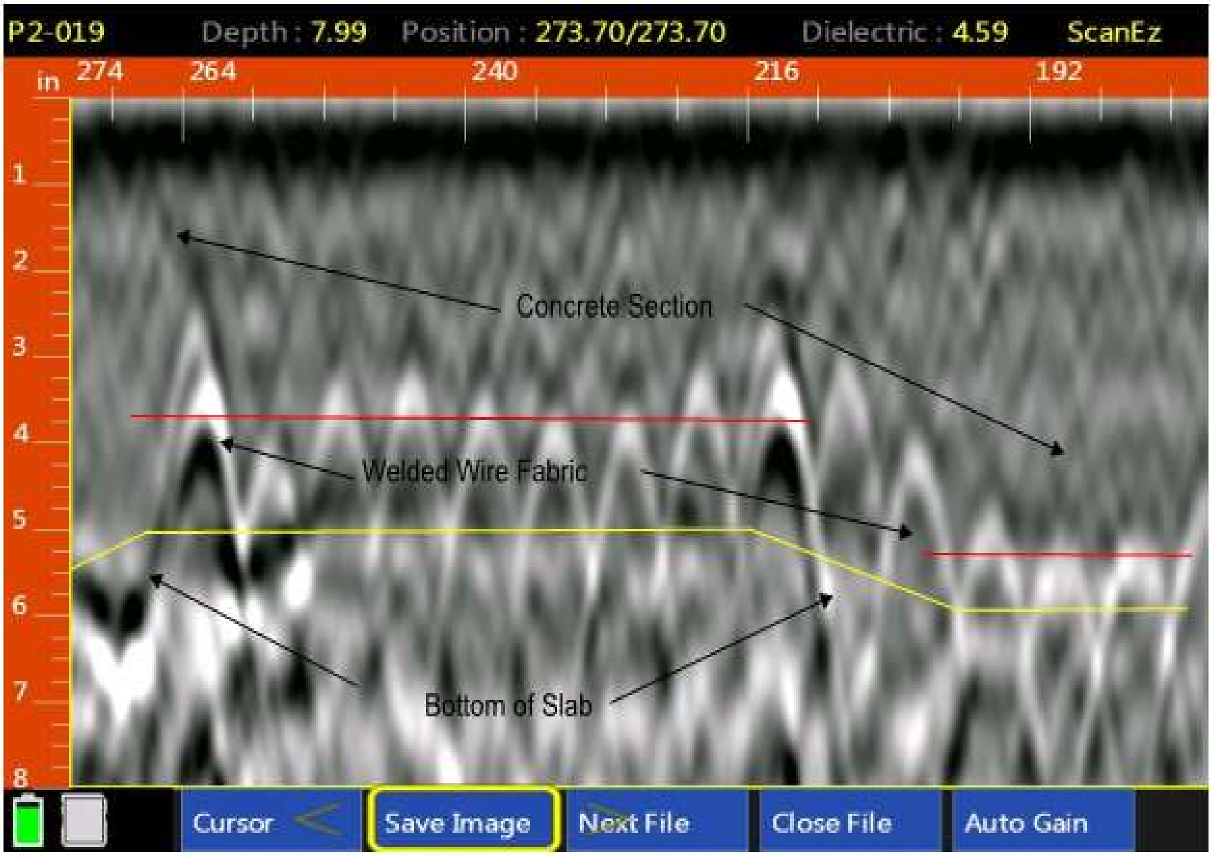


Photo 14. Radiogram view of driveway slab showing interpreted concrete section, presence of welded wire fabric reinforcement (3¾" to 4¾" depth), and bottom of concrete slab (5" to 5½" depth).

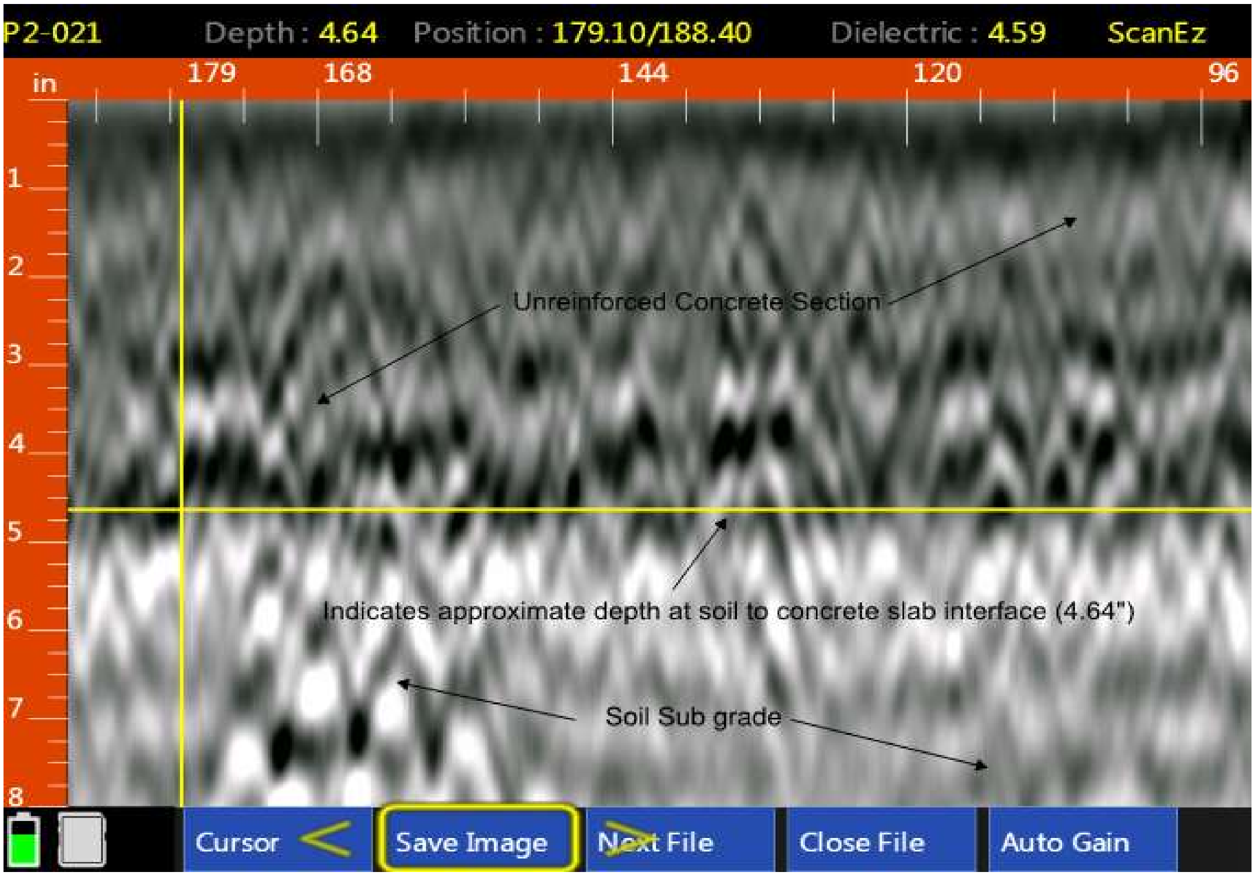


Photo 15. Radiogram view of garage floor slab showing interpreted concrete section thickness (roughly 4½" thickness). The radiograms gathered for the garage slab showed no evidence of steel reinforcement.

Manual Percussion Sounding

A limited manual percussion sounding survey was conducted over the driveway slab surface. In this survey a Kirby® brand forensic percussion wheel test was used to evaluate the presence of possible subsurface soil subsidence or interface void development. The percussive force caused by the tapping (sprocket wheels) typically produces hollow or dull acoustical soundings, indicating possible soil subsidence beneath the slab-on-grade construction. In the event possible voids are detected, additional soundings are evaluated locally to determine the extent or boundary of a possible defect.

Manual impact sounding utilizing a percussion wheel identified apparent acoustical responses consistent with the presence of local soil interface subsidence. Approximate locations of apparent uneven slab-subgrade contact are shown on Figure 1. Localized GPR surveys and interpretations of radiographic images further suggests there to be a potentially narrow interface (void) located variably surrounding the areas of driveway slab construction.

Visual Observations

Findings of our visual observations are noted below.

- Driveway slab placement appears to be of conventionally hand (rodded) or screeded construction.
- Driveway slab finish exhibits variable flatness and levelness finishing quality.
- Driveway slab received a light broom application at the time of finishing.
- Tooled control joints were provided within the driveway slab construction. Measurements recorded indicated tooling depth to range from 1/2" to 5/8". Industry recommendations indicate jointing for slab-on-grade construction to be a minimum 1/4 the depth of slab. Thus, for a slab with a nominal thickness of 5 inches, the required tooling depth would be 1¼".
- Driveway slab cracking does not exhibit appreciable vertical "offset" over crack interface planes.
- Tooling geometry of the divided driveway panel is irregular as constructed and can produce inconsistent dimensional stresses resulting from inherent volume changes during early-age curing.
- Crack features within the concrete slab construction included a combination of transverse, longitudinal and random network cracking. Characteristic shrinkage cracks are apparent throughout the general slab construction.
- Driveway crack widths commonly range in size from "hairline" to 0.028" (see Photos 4 and 5 above).
- Driveway cracks appear to develop as shallow or near-surface features; however, some cracks appear to develop as sectional "through" cracks.
- Typical garage floor slab cracks are noticeably wider than driveway slab cracks and most include vertical offset (see Photos 6 through 11).

CONSTRUCTION MITIGATIONS/CONSTRUCTION REPLACEMENT COST

The cost to construct a new concrete driveway depends largely on the size, thickness, shape, site prep, labor and location. Where considering replacement costs, reconstruction may be considered using the like kind and quality materials, and construction standards, to include additional expenses related to demolition costs and debris removal and construction materials cost fluctuations. These factors create a valuation that is generally higher than new construction. Where determining order magnitude replacement costing, according to industry estimating data-based publications, predictive cost data for most concrete driveway replacements range between $4 to $15 per square foot, with an average of $10 per square foot when considering demolition costs and debris removal and disposal. Smaller areas, such as the 3-foot by 5-foot asphalt patch in the southeast corner of the driveway, may be subject to a job minimum with a final cost per square foot that exceeds the estimate provided above. Construction cost data companies, including BNI, RS MEANS or other reputable market-based construction estimating platforms may be consulted for updated replacement costs and details.

CONCLUSIONS

Slab cracking may result from a combination of factors such as design considerations, geotechnical influences, age of structures, quality of construction, drying shrinkage, and external or internal applied stresses. In our evaluation of the driveway and garage slabs, we considered these factors in addition to the materials used in construction and external influences known to produce cracks in slabs-on-grade. Based on our consideration of these factors and our observations, in our opinion the observed slab cracking is not recent (i.e., not produced within the past few years) and likely predates 2016. However, we cannot preclude the possibility that some of the observed cracking, particularly on the driveway and close to the street, could have been exacerbated or widened by the application of wheel loading. Such loading, however, is not a likely contributor to the observed condition of the garage floor slab. Based on observations and tests performed to date, we believe the observed driveway slab remains in a serviceable condition. The current level of observed distress caused by the slab cracking does not appear to compromise the general functionality of the slab section.

As cracking is an inherent characteristic of Portland cement concrete, it is normal to observe variable effects of cracking. Design considerations, materials, handling, and construction practices largely control the extent and amount of crack development in concrete construction. At the subject property the extent and frequency of the cracking observed within the driveway construction predominantly resembles crack features typically associated with early-age drying shrinkage caused by normal volume changes or variable restraint within the slab construction. Elongated or irregular panel dimensions broken up by joinery provisions can often produce irregular stress development during early age curing, producing incipient or latent slab cracking development.

Where joinery provisions are ineffective in providing for proper stress dissipation at early-age strength development, random network cracking can develop as can be seen within the driveway slab area. Slab shortening, which develops in the form of stress relief (cracking) in both longitudinal and transverse orientations, represents volumetric/dimensional change where interior or perimeter restraint is commonly caused by the effects of concrete curing or other combined external sources. Other possible contributing factors associated with the observed crack development may include uneven curing, high water-to-cement ratio mixtures, excessive bleed water, and slow loss or alteration of evaporation rates of bleed water during finishing operations.

Concrete slab placement, combined with commonly used means and methods of construction of residential concrete flatwork, often results in inadequately-prepared or weak subgrade soils, which commonly results in settlement and the formation of voids under the slab similar to those inferred from the percussion sounding observations described above. Further, the native clayey subgrade soils in the area are commonly moderately to highly plastic and subject to volume change with changes in moisture content (i.e., soil shrinking and swelling), which may lead to movement of the overlying slab sections and production of some of the larger heaving and cracking observed in the garage and driveway slabs.

In our opinion, the apparently light reinforcement detail may not provide for sufficient stiffness where subgrade soil support is inadequate or where subgrade soils are subject to volume change. Radiographic images produced by GPR scanning suggest that much of the reinforcement had been improperly positioned within the concrete section, reducing its effectiveness against restraint and other stresses, resulting in the observed relief cracking.

Based on our observations, in our opinion the observed slab cracking in the driveway and garage floor slab results from a combination of factors that include inadequate subgrade preparation during construction, construction on subgrade soils that are susceptible to volume change (shrinkage and expansion with changes in water content), and inadequate reinforcement provision.

LIMITATIONS

We have prepared this report in accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty is expressed or implied.

Sincerely,

KLEINFELDER, INC.

REGISTERED PROFESSIONAL ENGINEER
MARK D. FUHRIMAN
GE 2808
EXP 12/31/23
GEOTECHNICAL
STATE OF CALIFORNIA

John E. Nicolini
Principal Materials Engineering Expert

Mark D. Fuhriman, PE, GE
Senior Principal Geotechnical Engineer

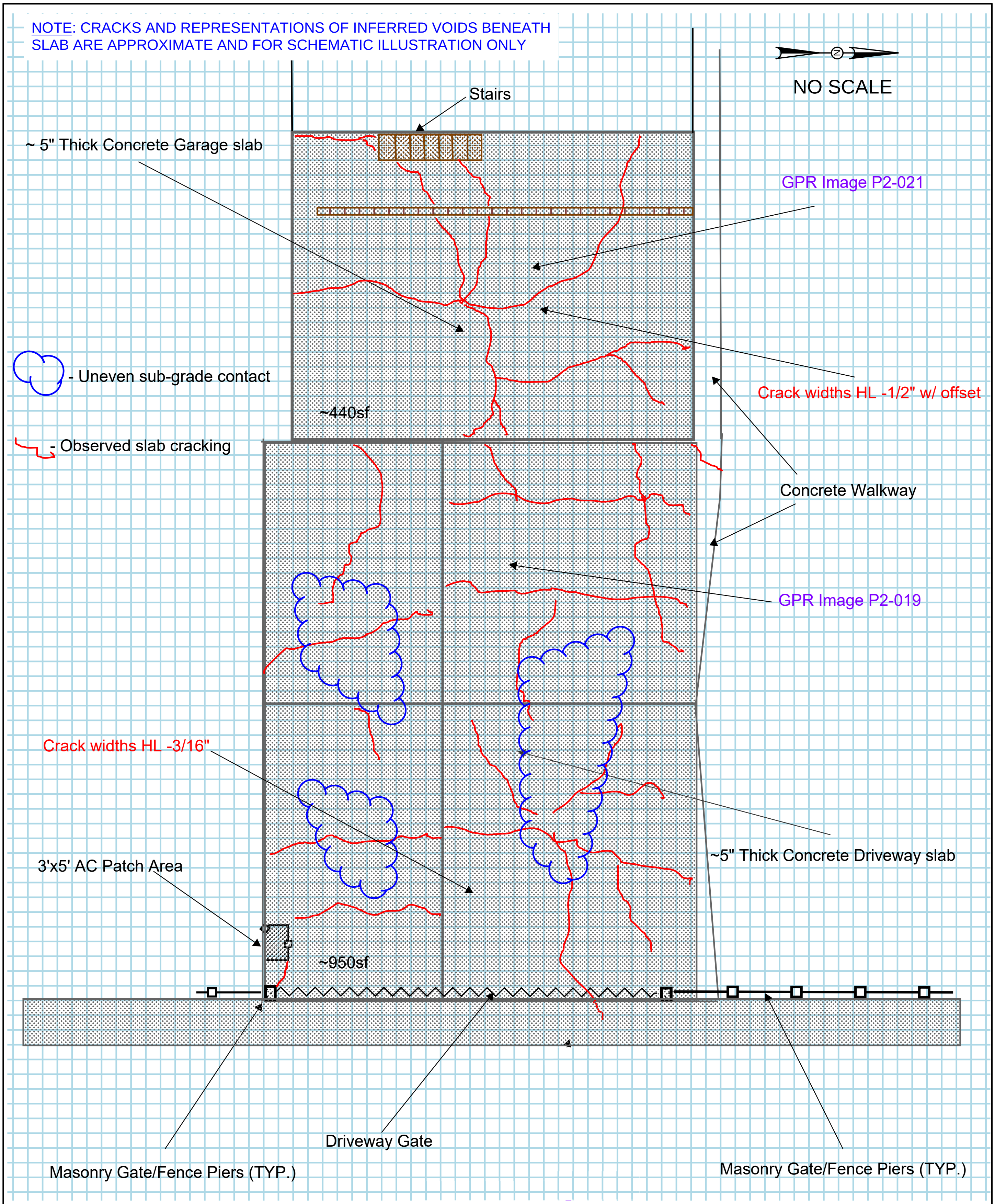
The following are attached and complete this letter report:

Figure 1 – Schematic Driveway Plan

Appendix A – Resumes
Appendix B – Investigation Report by R Sinclair Group, LLC
Appendix C – Kleinfelder Review of Investigation Report by R Sinclair Group, LLC

cc: Joseph Sun (JIS4@pge.com)

FIGURES



KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20224083.001A DRAWN BY: JN CHECKED BY: MDF DATE: 2/11/2022 REVISED:	**SCHEMATIC DRIVEWAY PLAN**	FIGURE	
	PG&E CLAIM FILE NO. B19446484 2845 MAGNOLIA STREET OAKLAND, CALIFORNIA	1	

APPENDIX A

RESUMES

Total Years of Experience
40 Years

Education
BS, Construction Management/Engineering

Certifications/Training
Condition Assessor of Existing Buildings – ASCE

ACI Certification No. AC01021:
- Certified Construction Project Manager (CCPM)
- Certified Construction Consultant (CCC)
- Certified Construction Inspector (CCI)

ICC / IAS-Evaluations Services (Structural Material Component Evaluation Services Auditor)

ICC Special Inspector:
- Reinforced Concrete
- Reinforced Masonry
- Fireproofing
- Pre-Stressed Concrete

ES Facility Auditor / ISO 17020 and ISO 17025 Certified

C-1 Certification of Protective Coating for Industrial Application

HAAG Certified Roofing Waterproofing Consultant - Commercial #201311205

John Nicolini

Principal Materials Engineering Expert

Mr. Nicolini has 40 years of specialty testing, inspection, and materials engineering consulting experience. In his 33 years with Kleinfelder, His project portfolio includes both new and retrofit projects surrounding healthcare facilities, airports, large commercial and industrial buildings, educational institutions, transportation, military and public works and historic facilities. Materials consulting experience includes evaluation of applied Portland cement products, asphalt, roof systems, steel, masonry, concrete, waterproofing systems, evaluation and remediation of exterior wall treatments to include plaster, wood, EIFS and applied coatings technology. He is also responsible for the supervision and management of technical, inspection, and engineering staff.

Mr. Nicolini possesses both design and construction experience which has also involved him in numerous forensic investigative projects, and include assessments surrounding constructability, integrity and compatibility studies of conventional building materials and systems, construction and design deficiency identification, construction and design document reviews, determination of as-built conditions to include specialized on-site destructive and non-destructive evaluation and testing. Mr Nicolini also has been retained as an expert witness and has provided deposition as well testimony specific to construction litigation claims.

Mr. Nicolini has been involved in numerous materials engineering concrete investigative projects related to conventional building construction of which include elevated support structures, chemical, nuclear, marine, waste water and water storage facilities. He has extensive field and laboratory forensic testing experience performing material evaluations utilizing various specialized evaluation techniques as well he has a comprehensive understanding of applied materials engineering science and possesses an extensive knowledge working with governing codes and standards as well related industry accredited building agencies and professional engineering organizations which include ICC, IAS-ES, IAPMO-ES, ASCE, AISC, ASHTO and DSA.

Relevant Forensic Project Experience (Partial List)

Port of Guam, Guam, USA Pier F5 - Concrete Distress/Corrosion Study

Vandenberg Airforce Base, Vandenberg AFB, CA - Concrete Distress/Corrosion Study

Lake Cammack Dam, Burlington, North Carolina - ASR / Petrographic Examination/Interpretation of Distress

Anheuser-Bush Companies, Kathabar Facility, Fairfield, California - Concrete Corrosion Study

Eagle Precast-Wallowa Eagle, Idaho - Box Beam Bridge - Concrete Distress Study

Contra Costa Community College Library San Pablo, California – Concrete Fire Damage Assessment

Qualcomm Stadium San Diego, CA - Concrete Paver Study

UCD Davis, CA J1 Upgrade - Petrographic Examination Self Leveling Concrete Distress

Shell Martinez Refinery, Martinez, CA - Concrete Pier Foundation Tank Support Survey

General Chemical Plant, Richmond, California - (ASR) Concrete Tank Foundation Study

Monterey County, Salinas, CA - Conference Center Building – Slab Distress /Crack Study

NorthBay HealthCare Fairfield, CA - Slip Fall Friction Testing of Walkway Surfaces

PG&E Moraga-Oakland Towers #1 and #2 5/36 - NDE Concrete Retaining Wall Survey

Pacific Place Towers, San Francisco, CA - Concrete Corrosion Study

UCD Primate Center, Davis, CA – Concrete Coating Failure Study

UC Berkeley-Latimer Hall, Seismic Retrofit Project, Berkeley, CA Colored Concrete Defect Study

LACMTA Metro Maintenance Building, Chatsworth, CA - Concrete Floor Slab Distress Evaluation

El Camino Park Reservoir Structure, Palo Alto, CA - Placement Quality/Delamination Study

Department of Corrections, Tamaulipas Juvenile Hall Wing Addition, Martinez, CA – Concrete Distress Study

County of Monterey, New Juvenile Hall Salinas, CA - Slab Cracking Distress Study

RESUME

Total Years of Experience
32 Years

Education
BS Civil Engineering
Brigham Young University

MS, Geotechnical Engineering
University of Texas at Austin

Registration/Certification
Professional Engineer – Civil, CA No. C599224

Geotechnical Engineer, CA No. GE2808

Mark D. Fuhriman, PE, GE

Senior Principal Geotechnical Engineer

Mr. Fuhriman is California-registered civil and geotechnical engineer with over 32 years of experience, which includes commercial and institutional buildings and other developments, water resources infrastructure, industrial facilities, power transmission facilities, deep and shallow foundation design, stability of earth and rock slopes, soft ground construction, and ground improvement design for earthquake hazard mitigation. He is an expert in field exploration methods in soft soils, the measurement and analyses of dynamic soil and rock properties, including field methods (e.g., seismic wave velocity) and laboratory methods (e.g., resonant column and cyclic triaxial testing). In his daily responsibilities, Mr. Fuhriman plans, directs, and performs site reconnaissance, field exploration, geotechnical design, and consultation during construction.

Selected Project Experience

Confidential Client, Geotechnical Consulting Services during Design and Construction, Major Campus Development, Mountain View, CA (2015 – Current). Geotechnical project lead for final design and construction of an innovative structural and architectural design that incorporates a canopy structure over an interior podium structure on a 13-acre site. The program includes approximately 945,000 sf of built environment, including 595,000 sf of enclosed program space, 200,000 sf of enclosed non-programmed space, and 150,000 sf of district utility system (partially below grade). Services include leading the development of foundation design parameters and recommendations, including shallow and deep foundation analyses and development of numerical models for detailed settlement analyses incorporating several iterative analyses with the structural engineers and executive architect teams to develop economical foundation design concepts that meet rigorous performance requirements. During construction, Mr. Fuhriman is providing on-going consulting to ensure earthwork, foundation subgrade preparation, and related aspects of construction are performed and documented to be in accordance with the geotechnical design requirements.

TransMontaigne Tank Foundation Rehabilitation, Martinez, CA (2019 – 2021). Lead geotechnical engineer for the foundation rehabilitation of two existing storage tanks at a terminal facility. Tank sizes range form 100 to 150 feet in diameter and are 50-feet tall. Tanks are of welded steel construction with floating roofs and are founded on reinforced concrete ringwall foundations. Foundation soils under the tanks are highly variable, ranging from compressible and weak clay to sandstone bedrock. The highly variable foundation soils conditions caused tank settlement that exceeds tolerable limits. Mr. Fuhriman is collaborating closely with the structural designer and the owner to devise a plan to remediate the tank foundations, which will allow the tanks to be brought into service. Design challenges include the variable soil conditions and remnants of previous attempts to use soil-cement columns to provide tank foundation support. Mr. Fuhriman's remediation plan includes use of driven steel H-piles.

Confidential Client, Geotechnical Consulting Services during Design and Construction, Major Campus Development, Moffett Field, CA (2016 – Current). Geotechnical project lead for final design and construction of an innovative structural and architectural design that incorporates three canopy structures, each enclosing interior podium structures. The total site area is 19 acres. The program includes over 1,300,000 sf of enclosed program space, buried utilities, and roadways. The project includes the installation of nearly 4,000 drilled displacement piles. At Mr. Fuhriman's suggestion, the program adopted the incorporation of an innovative "energy pile" system, which uses the project's deep foundations to store energy and thereby reduce the demand on cooling towers and related appurtenant structures. Services include leading the development of foundation design parameters and recommendations, including shallow and deep foundation analyses and development of numerical models for detailed settlement analyses incorporating several iterative analyses with the structural engineers and executive architect teams to develop economical foundation design concepts that meet rigorous performance requirements.

PG&E Strategic Alliance Contractor (1997 – 2022), Various Locations, CA. **Chief geotechnical engineer** in support of natural gas pipelines, power transmission lines, substations, power plants, and **emergency response / mitigation of landslides and construction problems in weak soils.** Provided technical guidance and **geotechnical expert review** for the geotechnical investigation of the gas insulated switchgear building at San Mateo Substation, which is located on **weak, compressible Bay Mud soils** in San Mateo, California. Provided key expertise for basement design, which is situated on **weak fill soils** with **shallow groundwater**. Other project demands included high lateral loads that needed to be carried by **deep foundations**. Developed a foundation approach that used **augured, cast-in-place (ACIP) piles** to **reduce pile driving noise** and **vibration impact** on the adjacent residential neighbors. Provided **direction** and **technical guidance** to the foundation construction contractor and Kleinfelder's field inspectors to ensure installation in accordance with the design requirements. **Geotechnical engineer** for **design evaluation** of a bank of new transformers at Substation C to include five new power poles up to 45 feet in height, and six pads supporting new transformer banks and equipment. Analyzed and designed **cast-in-steel-shell pile foundations** to resist **earthquake-induced liquefaction** and **lateral spreading**. Analyses included **soil-structure interaction analyses** to show the expected **foundation performance** under extreme earthquake loading.

Mountain View / Moffett Area Recycled Water Pipeline, Santa Clara County, CA. **Project manager** for all aspects of **geotechnical design** of this critical piece of infrastructure, which includes the immediate neighborhoods through the existing Google campus in Mountain View and the proposed Bay View project site. **Coordinated** local team of experts to evaluate alignment's **complex geologic environment** including **weak, compressible soils** with high groundwater, **liquefaction susceptibility**, **design** of **excavation support** and **dewatering** plans for variable ground conditions, and **soil-structure interaction** of the pipeline system.

APPENDIX B

INVESTIGATION REPORT BY R SINCLAIR GROUP, LLC

Lead Investigator	**Matthew T. Kisak, P.E.**
Consultant	**R Sinclair Group, LLC**
Date of Report	**08/10/2019**
Subject	**Concrete e Driveway and Garage – Weight Load Failure**

<u>Operation, Location, and Consequences</u>

Estimated Date of Failure	**03/11/2016 – April 17, 2017**
Product Failure	**Concrete Driveway and Garage Floor (Structural)**
Reason	**Heavy Equipment/Excessive Weight Caused Failure**
City, County & State	**Oakland Alameda, California**
Operators Name	**Pacific Gas and Electric (PG&E) 230 Market Street San Francisco, CA 94607**
Other Agency	**USA – Emergency Utility Location Service**
Response Time	**N/A**
Work Order No.	**N/A**
Time Acknowledged	**N/A**
Location	**2845 Magnolia Street, Oakland, CA**
Type of Failure	**Concrete Cracks and Fracture's (Excessive Load Bearing)**
Fatalities	**0**
Injuries	**0**
Description of area	**Residential Dwelling (3 Bedroom Dwelling)**
Property Damage	**$30,877**

Executive Summary

Thereof March 2017, PG & E (hereafter "Operator") and Roadway Construction, Inc. (hereafter "Contractor") appeared to have caused sizable cracks and failure to 7 to 4 inch thick, fibermesh reinforced 3500 PSI "Concrete Driveway" by operating "Heavy Equipment" and "Excessive Vibrations" which appeared to have caused like damage to "Concrete Garage" floor at 2845 Magnolia Street Oakland, CA. In addition to these damages Operator's Contractor also saw cute "Concrete Driveway" near the entrance (south side) and replaced it with black top asphalt (an inferior material). Analysis determined the probable cause of failure to be excessive load bearing . It is of note that on September 6, 2017, Mr. & Mrs. Green (hereafter, "Green's" or "Property Owner") requested information from the Operator pertaining to this incident in accordance with the "Public Information Request Act". The Operator did not respond in a timely manner to this request and upon response provided partial documentation with the stipulation that select information was withheld per stipulations of the "Public Information Request Act". Therefore, the Operator has inferred that additional documentation to this event is in their possession with bias. Should these proceedings advance to litigation such documentation will be recovered during discovery. It was noted that according to Operator's records the Gas Pipeline Replacement Program (GPRP) was under the oversight of Ms. Vitaly Tyurin, East Bay Division Manager. On April 17, 2017 Ms. Tyurin informed the Green's if they had issues concerning safety, etc. to contact the local representative Rosanne Cruz. Property Owner has stated that Heavy Equipment was operated in close proximity to luxury automobiles and may have caused damage to surface and undercarriage.

System Description

The Operator's website (Customer Service) has acknowledged the standard operating procedures for the Gas Pipeline Replacement Program (GPRP):

The GPRP will accentually replace gas pipelines in the street and pipelines that run from the main into various buildings and homes. The GPRP may also require the relocation of gas meters.

Operator's website states: ***This work is part of our extensive Gas Pipeline Replacement Program to improve gas service to our customers. We are replacing them with modern new piping that is more resistant to corrosion and earth movement. Our goal is to have a more reliable system with less maintenance and lower energy costs. The relocation of some gas meters may be required under current California Public Utilities Commission (CPUC) requirements and or local codes and ordinances and is based on today's safety considerations.***

This project allows PG&E to meet a commitment to our customers to provide safe, reliable service. The Gas Pipeline Replacement Program (GPRP) is by agreement between our company and the CPUC. The pipe replacement priorities are based on age and pipe leakage history, so the highest priority pipe will be replaced first.

The GPRP is scheduled to be completed by means of three phases of operation stated in detail on Operators website. In particular Phase 2 states "Heavy equipment is necessary to facilitate this work". It is questionable if Operator fulfilled its commitment to the community (based on comments made by neighbors to the Greens) and property owner during this phase of the GPRP.

Incident Description

PG & E's Contractor damaged Concrete Driveway and surrounding property during installation of gas pipeline and road work for the Gas Pipeline Replacement Program (GPRP). The incident occurred on or about March 11, 2016 thru April 17, 2017. The location of the incident in question is 2845 Magnolia Street, Oakland, CA 94605, which is a Multi Family Structure Built in 1982, with two one story dwellings, which sits on a 7,261squire foot lot and features 4 bedrooms and4 bathrooms. According to City records this property was built in 1982, with an additional unit built in 2005. Based on RSG's initial site visit, review of documents, and professional evaluation by Mr. Matthew T. Kisak, P.E. (Civil), it is our conclusion that the aforementioned activities related to GPRP caused the incident attended to by Operator's Contractor performing demolition, excavation, pipe installation, import/ export of material, etc. The incident in question was documented to be the cause of the Operator's Contract use of heavy equipment on and in close proximity to the above-referenced property and therefore potentially caused sub terrain instability to the surrounding area, with the possibility of causing excessive vibrations, which may have caused subterranean destabilization and structural failure, thus impacting structural integrity.

Operating Conditions Prior to Incident

Prior to March 11, 2016, the incident the property and structure had no historical or discernable sizable cracks or failure. Time stamp photograph confirm this statement. Cracks and failure were not detected prior to Operator's Contractor construction activities related to GPRP. Based on standard engineering practices it is our assessment that normal passenger vehicle usage would not cause server damage to 7 to 4-inch-thick, fibermesh reinforced 3500 PSI "Concrete Driveway/Slab". Review of dated photographs and security system recordings conclusively confirm condition of property prior to GPRP activities.

Investigation and Operating Conditions after the Incident

On March 11, 2016 PG & E responded to property owner's complaint pertaining to what is now known to be structural concrete failure at the incident site due to operation of heavy equipment on property driveway and surrounding area. It is assumed that these factors caused damage to the property in question. During the investigation, we assumed the Operator was made aware of these incidents by the Contractor under contract for this phase of the scope of work. Obviously, due to these factors the Operator implementation of the GPRP has caused the property owner to incur damages, cost and inconvenience. The property has lost value due to these events and the integrity of the of the structure's components are questionable due to these factors.

Concrete Analysis

Concrete failure analysis is the process by which an engineer determines the mechanism that has caused a material component to fail. Typical failure modes involve various types of deterioration and mechanical damage. Concrete components fail as a result of the environmental conditions to which they are exposed, as well as the mechanical stresses they experience. Often a combination of both environmental conditions and stress will cause failure. A Concrete failure analysis takes into account as much of this information as possible during analysis. The final goal of failure analysis is to provide a determination of the root cause and a solution to any underlying problems to prevent future failures. Non-Destructive Testing (NDT) is generally used to detect failures in components before the component fails catastrophically. Standard failure modes which can lead to distinct Concrete failure mechanisms are accepted by ASTM, ASM and NACE. We mention

these factors due to the nature of the incident under consideration and the Operators admittance to heavy construction equipment usage in the proximity of the property and confirmation by dated photographs and the property owner's security surveillance system.

The following data is based on Federal Highway Administration standards. The Operator's Contractor used heavy equipment that PSI strength that may have been that of a fully loaded Semi-truck and Trailer. That being the case, it takes some mathematical formulas for weight distribution, and the numbers will vary slightly as the weight is not perfectly distributed to each wheel, but we can approximate, and know it will be thereof 5,000 PSI Exterior concrete, poured to a thickness of at minimal 6 inches, at 6 inches it may crack. To conclude this scenario 3 calculations were used:

1. **First the surface area of each test wheel was determined: for math purposes the test simulation used simple numbers: 12″ wide wheel and 6″ thickness is touching the ground. 12″ x 6″= 1 x .5 = .5 SF touching ground, times 18 wheels = 9 SF touching the ground.**

2. **9 SF divided by 90,000 pounds = 10,000 pounds per square foot**

3. **10,000 pounds divided by 12 inches = 833 psi, pounds per square inch pressing down (seems like 5,000 PSI would cover it)**

Given an average tractor trailer truck, with 18 large wheels, on reinforced concrete placed on a good, dense, solid subgrade, 6 inches of concrete would hold the distributed load easily. Put the same load and concrete on 4 inches of concrete, and the slab would likely fail. To highlight this, point the failure was caused to 7 to 4-inch-thick, fibermesh reinforced 3500 PSI "Slab".

These calculations emphasis that the load bearing/stress factors described above are sufficient to establish failure due to Operator's Contractor usage of the Green's driveway as turnabout for the convenience of their equipment and construction activities. This allowed the Operator's Contractor to complete scope of work in a more expedited manner. Other equipment such as Construction Pavement Roller which typically weighs between 0.9 and 18 tons was also used.

Geotechnical – Vibration Analysis

Geotechnical analysis is the process by which a geologist conducts a technical analysis of the soil conditions surrounding and upon which a structure is located to determine soil properties on the site. Each construction or industrial site is different, and vibration mitigation measures should be correctly applied at each site. It is important to set performance criteria relating to vibrations and movement of surrounding buildings. Specifications for the control of construction vibrations should be prepared for major building projects. Harmful soil movements and structural damage from vibrations generated by construction and industrial sources can be prevented in most cases, Dowding (1996), Woods (1997), Svinkin (2004, 2005b). SOURCES OF CONSTRUCTION AND INDUSTRIAL VIBRATIONS

Based on these assumptions and structural failures it is evident that Specifications for the control of construction vibrations was not successfully implemented as part of GPRP. Based on this analysis sub terrain settlement due to subsurface vibrations caused by heavy equipment activities

cause failure to the driveway/garage slab area and upon further investigation we expect analytical data will yield conclusive evidence of damage to the principle structure.

Findings

1. The "7 to 4 inches" Damaged Concrete Driveway and Slab failure was due to excessive weight and vibrations.
2. These factors were caused by heavy equipment being operated on and in proximity of property.
3. Non – compliance to industry standards pertaining to weight load bearing.
4. Construction crew seemed to operate with minimal or inferior supervision.
5. At the time of the discovery, the Operator's Contractor denied obvious damage to property.
6. Based on Operator's documentation, the property owners were to be made aware of project activities and change to scope of work.
7. The Operator only provided partial documentation of the incident per stipulations of the "Public Information Request Act".
8. It is conceivable that a lack of proper training and procedures implementation led to the recorded and conceivably future structural failures, etc.
9. The Operator has acknowledged that it's goal to complete the GPRP on or within predetermined schedule deadlines was the determining factor driving the completion date and is therefore susceptible to producing system related failure.
10. Weather conditions were a non-factor in determining incident conclusions.

Conclusions

1. After analysis and review of related activity it was determined that Operator's schedule of construction work was the probable cause of the Damaged Concrete failure.
2. Due to the Operator's lack of monitoring and oversight the response time to actions is deemed unresponsive due to resulted time lapse between initial discovery and the response to reporting by property owner. It is thereafter, our opinion that said dwelling may continue to experience foundation and structural integrity issues in the form of water intrusion, raised flooring, improperly functioning doors and windows, Concrete cracks and ground fissures as a result of the incident.
3. Remedial measures are recommended to address and correct sub terrain erosion, driveway, slab, foundation and structural failures. It is advised that these activities commence as soon as possible due to unknown geological factors.

Appendices

Appendix A – Photographs
Appendix B – Property Owner Statement

APPENDIX C

KLEINFELDER REVIEW OF
INVESTIGATION REPORT BY R SINCLAIR GROUP, LLC

REVIEW OF CLAIMANT INVESTIGATION REPORT

As requested, Kleinfelder reviewed a report prepared by the claimant's consultant titled "Investigation Report – PG&E Concrete Driveway and Garage – Weight Load Failure, March 11, 2016 – April 17, 2017," prepared by Matthew T. Kisak, P.E. of R Sinclair Group, LLC (RSG), dated August 10, 2019 (five pages). The RSG report is included in Appendix B.

Kleinfelder finds several conclusions and opinions that, in our judgment, are not consistent with proper geotechnical or materials engineering practice. Our comments are provided below. Note that Kleinfelder makes no attempt to clarify or correct the numerous grammatical and syntax errors that occur in the RSG report.

- Page 1, under the heading "Operation, Location and Consequences" two structural failures are identified: "Concrete Driveway and Garage Floor (Structural)". The reason given for the noted "failures" is "Heavy Equipment/Excessive Weight Caused Failure."

  Response: In the opinion of Kleinfelder, the observed driveway cracks are not consistent with a condition of "failure". Rather, the cracks observed are typical of driveway concrete drying or shrinkage cracking in slab construction of this type. Further, there is no evidence cited in the report of heavy equipment or other excessive loads that traveled or were staged on the driveway or the garage slab.

- Page 2, Executive Summary

  1. The summary describes the "Concrete Driveway" as "7 to 4 inch thick."

     Response: The RSG report does not describe how a slab thickness of "7 to 4 inch" was determined. Kleinfelder used GPR scanning techniques and found the slab thickness to be typically about 4 to 5 inches thick.

  2. The summary states "Heavy Equipment…may have caused damage to surface and undercarriage" of "luxury automobiles."

     Response: There is no evidence presented of any possible damage to automobiles parked on or near the driveway.

- Page 3, under "Incident Description", RSG concludes the "activities related to the GPRP caused the incident" and "was documented to be the cause of the Operator's Contract use of heavy equipment" and "potentially caused sub terrain instability to the surrounding area, with the possibility of causing excessive vibrations, which may have caused subterranean destabilization and structural failure."

  Response: This hyperbolic description of ground failure resulting from construction-related vibrations is not consistent with an opinion developed by an expert in geotechnical or materials engineering. Further, no evidence of "excessive vibrations", ground failure ("subterranean destabilization"), or of unspecified "structural failure" is presented.

- Page 3, "Operating Conditions Prior to Incident"

  1. RSG affirms the "property and structure had no historical or discernable sizable cracks or failure. Time stamp photograph confirm this statement. Cracks and failure were not detected prior to Operator's Contractor construction activities related to the GPRP."

     Response: No photographic evidence is provided that demonstrates any of the cracks are related to the 2016 PG&E work. Further, an expert in materials engineering would not state that "no historical or discernable sizable cracks" existed on an approximately

40-year-old driveway prior to the PG&E work in 2016, as shrinkage cracks of the type currently observed on the driveway are common.

2. RSG states that "normal passenger vehicle usage would not cause server *[sic]* damage to 7 to 4-inch-thick, fibermesh reinforced 3500 PSI "Concrete Driveway/Slab"".

   Response: RSG does not provide any explanation of how a thickness of up to 7 inches was determined, how "fibermesh" reinforcing was detected, or how a presumed, as-built concrete compressive strength of 3,500 psi was measured. Using GPR tools and analysis methods, Kleinfelder found the driveway slab to be about 4 inches thick with steel welded wire reinforcement.

3. RSG states that "review of dated photographs and security system recordings conclusively confirm condition of property prior to GPRP activities".

   Response: No photographs are provided that show an absence of cracks in the driveway or in the garage floor prior to the start of the 2016 PG&E work.

- Page 3, "Investigation and Operating Conditions after the Incident"

  1. RSG states that "it is assumed that these factors [operation of heavy equipment on driveway and surrounding area] caused damage to the property."

     Response: No evidence or persuasive engineering-based argument is provided to support this assumption.

  2. RSG states "the integrity of the structure's components are questionable due to these factors".

     Response: No evidence or persuasive engineering-based argument is provided that demonstrates PG&E's operations resulted in compromised structural integrity of the driveway, the garage floor, or any other structure on the property.

- Pages 3 and 4, "Concrete Analysis" has a discussion of how concrete failures are investigated to determine a root cause of failure, including the use of nondestructive testing (NDT) and procedures endorsed by certain industry organizations.

  Responses:

  1. Among the industrial materials organizations cited by RSG is the National Association of Corrosion Engineers (NACE), which specifies standards for anti-corrosion coatings. As corrosion engineering is not a factor in this case, reference to NACE is improper and specious.

  2. RSG did not introduce the results of any specialized investigative field or laboratory testing to support a root cause engineering analysis of any alleged "failure" attributable to PG&E. RSG presents a wheel load analysis for a fully loaded, 18-wheel tractor-trailer rig operating on the driveway. This presentation is irrelevant as no such vehicle is known to have traveled across the driveway. A proper failure analysis would need to begin with reasonable load estimates of PG&E equipment or vehicles that are known to have traveled or operated on the driveway and account for preexisting conditions such as the actual slab thickness and known construction deficiencies (e.g., the apparent lack of uniform contact between the slab and the supporting subgrade and the improperly positioned wire mesh reinforcing). As stated previously, RSG provides no evidence to support the repeated assertion that the driveway consists of a "7 to 4-inch-thick, fibermesh reinforced 3500 PSI "Slab"".

3. RSG suggests that a "Construction Pavement Roller" weighing "0.9 to 18 tons" was also used. There is no evidence that any equipment weighing up to 18 tons entered the driveway or garage floor slab areas.

- Pages 4 and 5, "Geotechnical – Vibration Analysis"

  Responses:

  1. RSG begins with an inaccurate definition of "geotechnical analysis", identifying geologists and not geotechnical engineers as the professionals responsible for geotechnical site characterization.
  2. RSG cites a few references including a textbook on construction vibrations, an academic paper on monitoring ground motions during pile driving operations, and two other papers that address ways to reduce construction vibration effects. However, RSG makes no specific reference to any particular conclusions in these references, so their relevance is not established. RSG does not explain the relevance of these references, but RSG does assert that "Specifications for the control of construction vibrations" (that remain unidentified) were not incorporated into the construction.
  3. Although RSG asserts a lack of "specifications for the control of construction vibrations" as a contributor to "sub terrain settlement due to subsurface vibrations caused by heavy equipment activities" and that further investigation is expected to "yield conclusive evidence of damage to the principle *[sic]* structure", no basis for any such statements is presented. RSG does not present the results of any kind of vibration analyses to demonstrate threshold vibration levels that would define limits deemed tolerable. Neither does RSG produce data showing the vibrations produced during construction were of a level sufficient to produce damage of any kind on the property, much less the cracking observed in the driveway and garage slabs.

- Page 5, "Findings"

  Response: All of the summarized findings are speculative and not supported by laboratory or field investigation methods. There is no evidence presented that "Damaged Concrete Driveway and Slab failure" were "caused by heavy equipment operating on and in proximity of property." No suggested "industry standards pertaining to weight load bearing" are presented in the report.

- Page 5, "Conclusions"

  Response: None of the summarized conclusions are supported by information presented in the report or by commonly accepted engineering practice. Specifically:

  1. PG&E's construction schedule is not shown to be related to any "probable cause" of the supposed concrete damage.
  2. The RSG report fails to establish any plausible relationship between the 2016 PG&E project and continued "foundation and structural integrity issues", cracks in concrete flatwork, or "ground fissures" at the property.
  3. The urgent recommendation to correct unspecified "sub terrain erosion, driveway, slab, foundation and structural failures" due to "unknown geological factors" is hyperbolic and not grounded in a competent assessment of the effects of the PG&E construction or of the likely causes of the observed driveway and garage slab cracks.